present uncertainties as to the place of nature study in our educational system are to no small extent due to the emphasis on such vague purposes which appeal to few who have not the naturalist's outlook to nature.

Most of the book is devoted to the practical problems of class-room management, materials and arrangement of the course of study. All these chapters are good introductions for the beginner, and especially for students in normal schools. Nine of the ten chapters on materials are devoted to animals and plants, and the tenth deals with popular astronomy. Just why the author has chosen the heavens as the only representative of the physical side of nature is not apparent to the reviewer. The signs of the times indicate that here is a weakness, and that the nature study which may win a permanent place in our elementary education of the future must have a well-balanced mixture of the biological and the physical. The physical is extremely important for interpreting the biological aspects of nature, and to most people it makes a more convincing appeal from the standpoint of every-day life.

The outline of a course in nature study is based on no apparent underlying principles, but like most other outlines published is simply a list of topics taken at random. All principles of continuity, correlation and logical development seem to be neglected. Of course there are those naturalists who urge that nature study should be free from everything resembling the formal work common to the school room; but that kind of nature study has decided limitations and has made little permanent progress in American schools.

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Experimental Elasticity, a Manual for the Laboratory. By G. F. C. SEARLE. 8vo, pp. 187. Cambridge University Press. 1908.

The character of this book can be best seen from its origin. The author has been since 1890 director of the classes in practical physics of the Cavendish Laboratory, and has prepared for his students manuscript notes giving the theory and description of the experiments. He is now collecting these notes, and after rewriting and amplifying them when needed, they are to be published in a series of volumes which will cover the usual field of practical physics. It is appropriate that the first volume should be on experimental elasticity, a subject in which Mr. Searle's contributions are well known.

The volume is divided into three chapters, the first two chapters being theoretical and the third chapter giving detailed descriptions of the methods and apparatus of fourteen experiments in elasticity. The theoretical parts are generally elementary, but the use of calculus methods is not avoided. The theorems and methods of thermodynamics are also used. The sections using these more advanced methods could, however, be easily omitted without interfering with the use of the greater part of the book. The "notes" forming an appendix to the above three chapters give discussions of some of the elementary theorems of mechanics and mensuration. From this we can infer that the more advanced sections may have been added later to make the book more complete. The longest of these "notes" is entitled Hints on Practical Work in Physics, and gives brief, pointed directions on keeping note-books, making diagrams, methods of calculations, adding also an occasional moral hint. Thus the following might well be copied and framed for use in many laboratories:

> A steady hand, a keen eye and a good command of the body are essential in accurate physical determinations; mere intellectual power avails nothing by itself. Any rule of life which deviates from temperance in all things (including work) may be expected to render the hand less steady and the eye less keen and so lead to inferior work. University students whose fingers are deeply stained with tobacco do not, as a rule, become skilful observers, though they may show considerable ability in other ways.

Laboratory courses can not in general be transplanted as a whole, since each laboratory has its own selections of apparatus and experiments—that is, if it is a live laboratory. In the case of elasticity, the variations in forms of apparatus are not great and not funda-

mental. Hence this book will be available, particularly as a reference book, in many laboratories. The discussion of elementary elastic theory is excellent and not beyond the average undergraduate. More time is evidently given to elasticity by Mr. Searle's students than is usually possible in American colleges and universities for this part of physics. The only criticism that might be made is that several of the experiments given are very complicated for a practical physics course, but these are added experiments so that none of the standard experiments have been crowded out.

A. P. CARMAN

SPECIAL ARTICLES

A NEW GENUS OF CARNIVORES FROM THE MIOCENE OF WESTERN NEBRASKA

WHILE engaged in restudying the material described as *Amphicyon superbus* by the writer in the *Annals of the Carnegie Museum*, Vol. IV., p. 51, it has become apparent that the species, though allied to the European forms, should be regarded as generically distinct from them, and that it is more nearly related to *Daphænus* from the Oligocene of North America. The type specimen consists of a practically complete skeleton, which has been freed from the matrix and is ready for mounting. It is now being restudied and described in detail by the present writer.

For this new genus from the Miocene formation of western Nebraska I propose the name *Daphænodon*. The dentition and cranium show close similarity to *Daphænus* from the Oligocene, and the latter genus apparently represents the ancestral stock from which the proposed genus *Daphænodon* is descended.

DAPHŒNODON, gen. nov.

(Type *Daphænodon superbus* (Peterson), Specimen No. 1589, Car. Mus. Catalog Vert. Foss.)

Principal Generic Characters: Cranium comparatively short, broad, and low; muzzle large, sagittal crest prominent; brain-case small; incisors heavy and short; canines comparatively small and oval in cross-section; P^4 with antero-internal cusp of moderately large size; M^1 and M^2 large and broad; M^3 present, though small, practically one-rooted and aligned with the internal border of M^1 and M^2.

Upon very careful comparison of the type specimen of *Daphænodon superbus* with casts of *Amphicyon giganteus* (*A. major* Blainville) and also with illustrations of the best known European forms[1] it is evident that there are characters of considerable importance, which may be regarded as of generic value. The more important differences may be stated as follows:

The skull of *Amphicyon giganteus* is represented only by the left maxillary, but it indicates a cranium having considerably greater elevation from the alveolar border of the maxillary to the nasals than is the case in *Daphænodon superbus*. It is also seen that the alveolar border is more strongly developed posteriorly in the European genus, M^3 being succeeded by a considerable process of the maxillary, while in the American genus the border back of M^3 is extremely thin.

In the European form, *A. giganteus*, the canine is of very large size, sharply pointed, has a decided cutting edge posteriorly and a prominent rib on the antero-internal angle, which causes the cross-section of the tooth to be very elliptical, as in certain cats of the Oligocene, while the corresponding tooth in *Daphænodon superbus* is proportionally much smaller, the edges not so sharp in front and behind, and the tooth consequently having a more oval cross-section. The superior premolars in the European genus are proportionally smaller, P^4 has a distinctly smaller antero-internal tubercle and the long axis of the crown is more nearly antero-posterior, the tooth being placed less obliquely in the jaw than is the case in *Daphænodon superbus*. The superior molars of the latter genus differ in some important particulars, viz.: M^1 is of relatively greater transverse diameter and the posterior intermediate tubercles, especially the one on M^2, which closes the posterior opening of the median pit in *Amphicyon giganteus*, are absent. M^3 of the latter genus

[1] Blainville, Vol. II., Pl. XIV.; Filhol, *Ann. Soc. Geol.*, X., pp. 77–79, Pl. 10–16, 1879.